

REMARKS

Claims 1-36, 39-43, and 45-53 are pending in the application with claims 1, 4, 5, 34, and 35 amended herein and claims 37, 38, and 44 cancelled herein. Applicant notes that US Patent No. 6,878,402 issued on April 12, 2005, after the mailing date of the Office Action, and resulted from the Chiang patent application publication relied upon in the Office Action.

Claims 1-3 and 6-23 stand rejected under 35 U.S.C. 102(e) as being anticipated by Chiang. Claims 4, 5, and 34-53 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Chiang. Claims 24-33 also stand rejected under 35 U.S.C. 103(a) as being unpatentable over Chiang. Applicant requests reconsideration.

Amended claim 1 sets forth a deposition method that includes, among other features, at a first temperature, chemisorbing a first layer at least one monolayer thick over a substrate, altering the first temperature by adding or removing heat with a thermoelectric heat pump thermally connected to the substrate to establish a second temperature, and at the second temperature different from the first temperature, chemisorbing a second layer at least one monolayer thick on the first layer. Amended claim 1 thus incorporates the subject matter of original claim 5, including any intervening claims. Claim 1 as amended herein previously appeared before the Office and any new ground of rejection cannot be considered as necessitated by Applicant's amendment.

Page 3 of the Office Action acknowledges that Chiang fails to disclose each and every limitation of original claim 5. Accordingly, Chiang does not anticipate amended claim 1. Page 3 of the Office Action alleges that original claim 5 was obvious as differing from claim 1 only in the heating means which those of ordinary skill could allegedly determine through routine experimentation. Applicant traverses.

Review of Chiang reveals that it fails to disclose or suggest a thermoelectric heat pump thermally connected to a substrate upon which chemisorption of layers occurs. The Office Action does not allege that any part of Chiang discloses or suggests the claimed thermoelectric heat pump and further does cite any other reference in support of the alleged knowledge and routine experimentation by those of ordinary skill. Pursuant to 37 CFR 1.104(c)(2), the Office Action must designate as nearly as practicable the particular part of a reference relied upon. Specific column and line numbers or paragraph numbers are preferred. Also, while obviousness can be established by modifying references, some motivation must exist in the art to support the modification. The mere fact that the prior art can be modified does not make the modification obvious unless the prior art suggested the desirability of the modification.

The Office Action fails to document properly support of its alleged motivation with a prior art reference. The Office Action merely alleges that "routine experimentation" would result in using a thermoelectric heat pump to improve the uniformity of heat across the wafer. However, the Office

Action does not allege that such motivation is found in the prior art and does not refer to any portion of Chiang to support the allegation.

Establishing prima facie obviousness requires that the prior art must suggest to those of ordinary skill that they should carry out the claimed process. Also, all of the claimed limitations must be taught or suggested by the prior art. Given the deficiencies of Chiang discussed above and the deficiencies of the Office Action discussed above, Applicant asserts that the Office Action fails to support properly a showing that the prior art suggests carrying out the claimed process. Motivations not documented as in the prior art are irrelevant. Also, the Office Action fails to support the allegation that all claim limitations are taught or suggested by the prior art. Limitations not documented as in the prior art are irrelevant. At least for such reasons, claim 1 is patentable over Chiang. Claims 2-23 depend from claim 1 and are patentable at least for such reason as well as for the addition limitations of such claims not disclosed or suggested.

Claim 24 sets forth a deposition method that includes, among other features, atomic layer depositing a first specie approximately at an optimum temperature for the first specie deposition and atomic layer depositing a second specie on the first specie approximately at an optimum temperature for the second specie deposition different from the specie optimum temperature. Page 3 of the Office Action alleges that it would be obvious to determine the claimed optimum temperatures through routine experimentation given the heating temperatures in Chiang in order to

achieve the best growth rates. However, pursuant to 37 CFR 1.104(c)(2) the Office Action fails to designate the particular part of Chiang relied upon.

In the absence of a suggestion in the prior art of the desirability of modifying Chiang to produce the method of claim 24, claim 24 would be patentable over Chiang. Applicant asserts that the Office Action fails to support properly the allegation that Chiang, or a modification thereof, discloses or suggests every limitation of claim 24. At least for such reason, claim 24 is patentable over Chiang.

Claims 25-33 depend from claim 24 and are patentable at least for such reason as well as for the additional limitations of such claims not disclosed or suggested. For example, claim 26 sets forth that the method further includes reacting the second specie with the first specie at an optimum temperature for the reaction different from the second specie optimum deposition temperature. Review of Chiang does not reveal any disclosure or suggestion of an optimum reaction temperature that is different from optimum deposition temperatures. Accordingly, claim 26 is further patentable. Also, claim 30 sets forth that changing temperatures includes adding or removing heat with a thermoelectric heat pump and claim 31 sets forth that the thermoelectric heat pump thermally connects to the substrate. As established above with regard to claim 1, Chiang fails to disclose or suggest a thermoelectric heat pump. At least for such reason, claims 30 and 31 are still further patentable over Chiang.

Amended claim 34 sets forth a deposition method that includes, among other features, chemisorbing a first monolayer of a first compound while maintaining a substrate at a first temperature with a heater, adding or removing heat with a device different from the heater and establishing the substrate at a second temperature different from the first temperature, the device exhibiting a thermoelectric effect, and chemisorbing a monolayer of a second compound on the first monolayer at the second substrate temperature. The subject matter of original claim 35 is fully incorporated into amended claim 34. Accordingly, the subject matter of amended claim 34 previously appeared before the Office. Any new ground of rejection for claim 34 cannot be considered to have been necessitated by Applicant's amendment.

As may be appreciated from the discussion above regarding the deficiencies of Chiang as applied to claim 1, Chiang fails to disclose or suggest the claim 34 method using a device exhibiting a thermoelectric effect. Amended claim 34 is thus patentable over Chiang. Claims 35, 36, and 39-43 depend from claim 34 and are patentable at least for such reason as well as for the additional limitations for such claims not disclosed or suggested.

Claim 45 sets forth a deposition method that includes, among other features, chemisorbing a first monolayer of a first compound while maintaining a substrate at a first temperature with a heater, adding or removing heat with a device different from the heater and establishing the

substrate at a second temperature different from the first temperature, and chemisorbing a monolayer of a second compound on the first monolayer at the second substrate temperature. The method includes adding heat to establish the substrate at a third temperature higher than the second temperature and reacting the chemisorbed second compound with the chemisorbed first compound, adding or removing heat to establish the substrate at approximately the first temperature, and chemisorbing a second monolayer of the first compound on the reacted layer of first and second compounds. Applicant notes that the third temperature is different from the first temperature since claim 45 sets forth "adding or removing heat" to establish the substrate at approximately the first temperature after reacting at the third temperature. Page 3 of the Office Action alleges that Chiang discloses every limitation of claim 45 except for the heating means. Applicant traverses.

Review of Chiang does not reveal any disclosure or suggestion of a third temperature higher than the second temperature and used for reacting chemisorbed compounds. Chiang does not appear to recognize that any advantage exists in chemisorbing compounds at certain different temperatures and then reacting the compounds at a still different temperature. Paragraph 30 of the present specification discusses the advantages of the method set forth in claim 45. Review of Chiang does not reveal any appreciation for the advantages of the methods set forth in claim 45. Accordingly, Applicant asserts that no motivation exists to modify


Chiang and produce the method of claim 45. At least for such reason, claim 45 is patentable over Chiang. Claims 46-53 depend from claim 45 and are patentable at least for such reason as well as for the additional limitations of such claims not disclosed or suggested. For example, claim 46 sets forth that the device exhibits a thermoelectric effect. As established herein, Chiang fails to disclose or suggest the subject matter of claim 46.

At least for the reasons established herein, claims 1-36, 39-43, and 45-53 are patentable over Chiang. Applicant requests allowance of all pending claims in the next Office Action.

Respectfully submitted,

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